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OSCILLATIONS pH IN THE Salt – H_2O – OH^- SYSTEMS

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A mathematical model simulating oscillations pH solution in the heterogeneous system Salt – H_2O – OH^-. The model is based on experimental data and the provisions about supersaturation of solution and hydrolysis of precipitation.

Abstract. The synthesis of Thin films by using thioamides and salts at the presence of alkali is usually carried out by mixing the two solutions. The first solution (A) contains the salt and alkali and the second thioamide (B). Before mixing, the solutions could be in the state which sufficiently far from true equilibrium that may lead to irreproducible results after mixing the solutions. The deviation from the true equilibrium is determined by the "memory" effects of solution [1] and the possibility of the system state at the "oscillation mode", in addition to the above effects, the film properties depend on the concentration of reactants and temperature solutions. Thus, study of state of the solution A before mixing with the solution B at beginning of kinetic process of formation lead sulfide [2] is interesting to achieve reproducible results in the synthesis of films PbS. Unlike oscillations Belousov-Zhabotinsky, where are multiple damped oscillations [3] in our case there is a single oscillation through the formation of supersaturated solution by precipitate at the absence of its nucleations. With increase of concentration of the hydroxyl ions the precipitates are formed in sequence on the stoichiometric composition. Changing the stoichiometric composition of precipitates is often accompanied by the oscillations pH of the solution.

For the quantitative description of experimental data on the change pH solution by the time (see. Fig. 1) we proposed an equation to describe topochemical processes [4-5].

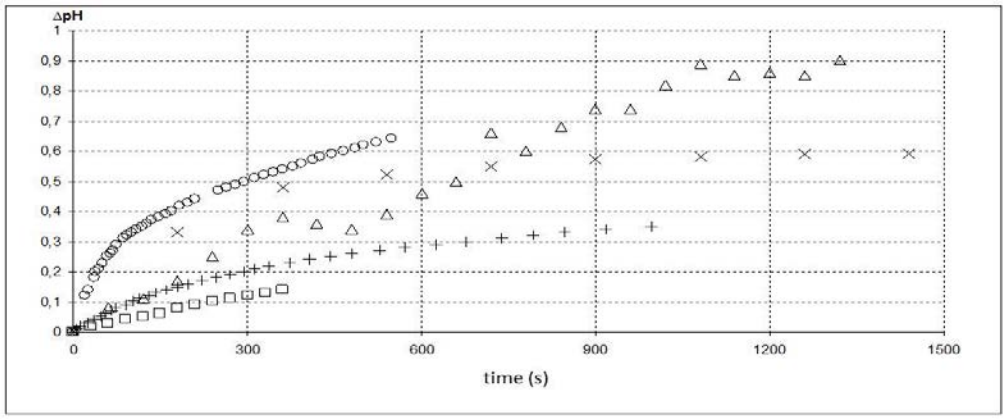

Figure 1 – Experimental data of changing pH solution at changing the reaction time of hydrolysis. Circles – 7/5 < n < 8/5, Crosses – 5/5<n<7/5 at the absence of solution NaOH in the system. Triangles and sloping crosses – 7/5<n<8/5, squares – 5/5<n<7/5 at the adding the solution NaOH to the system. $n = C_{NaOH*}V_{NaOH}/(C_{Pb(II)*}V_{Pb(II)})$.

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